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BENEFITS REALISATION OF AN IT IMPLEMENTATION IN A BANK: A CASE STUDY USING BMS

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Abstract

World-wide investments in information systems and information technology (IS/IT) have been increasing over the years. Despite this, research has shown that it is uncertain whether IS/IT investments, in large organizations, return significant business value (Caldeira et al., 2012; Ward and Daniel, 2012; Hesselmann, Ahlemann and Böhl, 2015).

Although there are several methods and frameworks developed to help organizations obtaining business benefits from the implementation of information systems, evidence has shown that the level of usage of those models and frameworks is relatively low (Lin and Pervan, 2003; Hallikainen et al., 2006). The purpose of this project is to analyse the Cranfield Benefits Management method and develop a software tool (BMS – Benefits Management System) that facilitates its use in organizations. A case study reporting the use of the software tool in a large Portuguese retail bank is also presented.

Key words: Benefits Management; Information Systems; Information Technology; Agile Software Development.

Introduction

Many information systems' projects fail to deliver business benefits (Hastie and Wojewoda, 2015; Serrador and Pinto, 2015; Vachon, 2016). According to Peppard et al. (2007), success in the implementation of information systems is often measured in terms of delivery time, money spent, and fulfilling business requirements, assuming that business benefits automatically occur. Peppard et al. (2007, p. 1) also state that, in order to get projects approved, the expected benefits are often overstated in pre-project appraisals, "*a ritual that must be overcome before a project can begin*".

Organizations aim to maximize the potential benefits of the implementation of information system by focusing mainly on technology deployment and fail to realize, and plan, the changes that individuals and groups must undergo to achieve the expected benefits. Frequently, decision-makers tend to justify investments in IS/IT implementations based on their personal belief that those investments will inevitably pay off (Serrano and Caldeira, 2002).

It is important to consider that many benefits may not be obtained immediately after project completion. They may be realized only after a couple of years, when business processes have been effectively changed and assimilated by the users (Peppard, Ward and Daniel, 2007; Caldeira et al., 2012)

This paper presents a case study within a Portuguese bank, where the use of the Benefits Management framework was supported by a software tool (BMS – *Benefits Management System).* The research project showed that BMS facilitates the application of the framework and thus the achievement of business benefits.

The following section describes the development of the software tool used within the case study. Section 3 will present the case study itself and how it was developed with the support of the software tool. The final sections analyse de results of the research and discusses future developments.

Developing a Software Tool for Benefits Management

The Benefits Management approach

Ward and Daniel (2012) presented a Benefits Management method with five main phases: Identify and structure benefits; Plan benefits realisation; Execute benefits plan; Review and evaluate results; and Potential for further benefits. An important framework of the method is the Benefits Dependency Network, which shows that benefits depend from changes in business processes, not directly from technology investments.

Although there are several methods and processes to evaluate and manage business benefits resulting from information systems' investments, a relevant question is whether practitioners

are actually using those methods. Ashurst et al. (2008) state that "*there is little evidence that organizations have been able to translate these academic prescriptions into effective working practices*". Lin and Pervan (2003) argue that the most difficult thing in the evaluation of an IS/IT project implementation is the identification and measurement of business benefits.

Although there are several methods for benefits management, the usage of a formal method is relatively rare (Lin and Pervan, 2003; Hallikainen et al., 2006; Hesselmann, Ahlemann and Böhl, 2015).

One of the "benefits" of a software tool for Benefits Management is facilitating the adoption of these methods. The use of software tools to support the Benefits Management process has been identified as having a potential positive effect on both the intention to use and the actual use of benefits management practices (Hesselmann, Ahlemann and Böhl, 2015).

The Agile Framework

In 2001, a group of seventeen software development experts presented the *Agile Framework for Software Development*, in order to facilitate IS/IT project development and implementation. One Agile approach is the *Scrum* method, defined by the *Scrum Alliance* as "*an Agile framework for completing complex projects*"[1]. The defining difference from *Scrum* to other software development frameworks is that "*the Scrum approach assumes that the analysis, design, and development processes in the Sprint phase are unpredictable. A control mechanism is used to manage the unpredictability and control the risk.*" (Schwaber, 1997, p. 10). *Scrum* does not prescribe any software engineering practice, it is a framework essentially applied to project management. The basic characteristics of *Scrum* method are the following:

1. *Scrum* is based on the premise that complex activities, such as software development, are impossible to be fully predicted. Change, therefore, is unavoidable and needs to me managed.
2. *Scrum* deals with change by building software in an incremental way, versus the all-at-once approach. Scrum also makes continuous assessment throughout software building.
3. *Scrum* reviews each step in the software development process and makes the appropriate changes for the next improvement. (Harvie and Agah, 2016)

The agile practices, which are recognized to work well, are basically an: adaptive planning, evolutionary delivery, time-boxed iterative approach, and flexible response to change (Cooper, 2016). Another practice which argueably is interesting, in the agile framework, is the process of defining user requirements and creating the product backlog by writing user stories (Cohn, 2004).

[1] In https://www.scrumalliance.org/ (accessed on May 22, 2017)

The BMS software

The software system developed in this project was named BMS (*Benefits Management System*). The requirements of the system were gathered from the literature and by a group of experts, using a Focus Group session. The Class Diagram[2] (Figure 1) represents the data model that supports the BMS software tool to manage the Benefits Dependency Network. The Class Diagram shows the conceptual structure of the database, using the standards from the Unified Modelling Language (UML). From this Class Diagram, a relational database schema was designed and a relational database created using a Database Management System (DBMS).

Some requirements were inputted directly into the database, for validation purposes:

- *Primary keys* of every main table are automatically generated by the relational DBMS and invisible to users.
- *Referential integrity* ensures that every *foreign key* corresponds always to a value in the primary key that it references, as defined in the theory of Relational Databases (Codd, 1970).
- For each main data entity (class) a three-character code was defined. These codes are a combination of one alphabetic uppercase character followed by a two-digit number. This rule has been widely used in published case studies, when creating Benefit Dependency Networks (Ward and Peppard, 2002; Caldeira *et al.*, 2012). The format for these codes, which are mandatory, is ensured by the DBMS, as the formatting rules were inserted into the database itself. For example, the Business Benefits table has a code with the format B01, B02, etc., and the Investment Objectives have the codes O01, O02, etc. as explained in the following paragraph. The uniqueness of these values for a given intervention is also ensured by the database management system.
- Although the original proponents of the Benefits Management processes do not explicitly refer to a coding standard for the elements of a Benefits Dependency Network, in most cases researchers and practitioners have been using some type of coding for these elements, as it is easier to reference by code than by name. Ward and Daniel (2012), although not specifically defining any kind of format for the codes used, state that some coding can be useful. In the development of the software tool, a validation rule was implemented within the database to ensure that each of the elements has a code starting with the respective letter assigned to that class of elements, followed by a two-digit number.

The uniqueness of the names of each record is ensured by the database management system.

[2] UML Class Model: Standard Diagram of the Unified Modeling Language (UML) generally used to define the Data Model in Object-Oriented Software development (Dennis, Wixom and Tegarden, 2009).

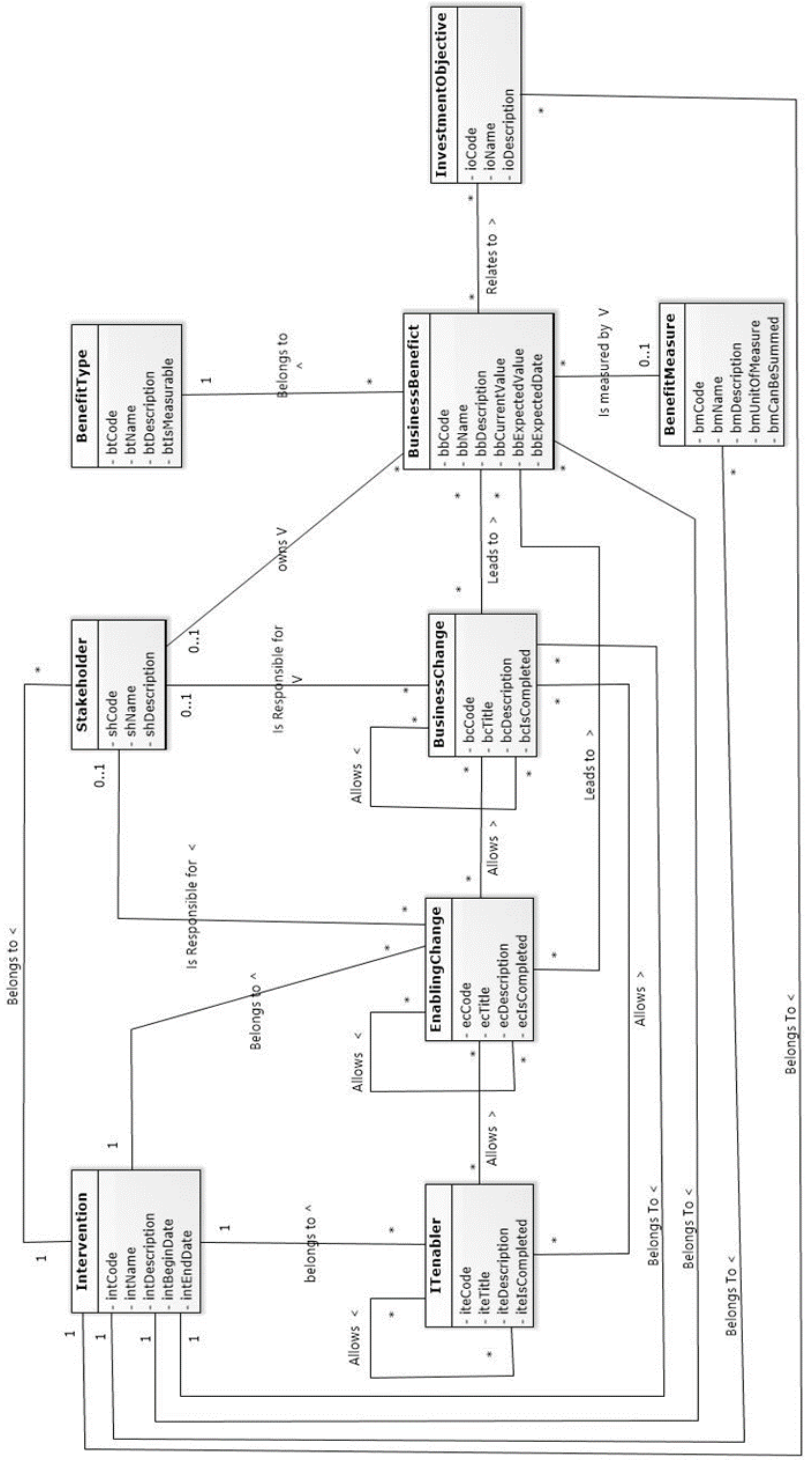

Figure 1: UML Class-Model for BMS

Figure 2 shows the main menu of the Benefits Management System (BMS). The image of an example Benefits Dependency Network is shown, highlighting each element as a button that will take the user to a specific area of the tool.

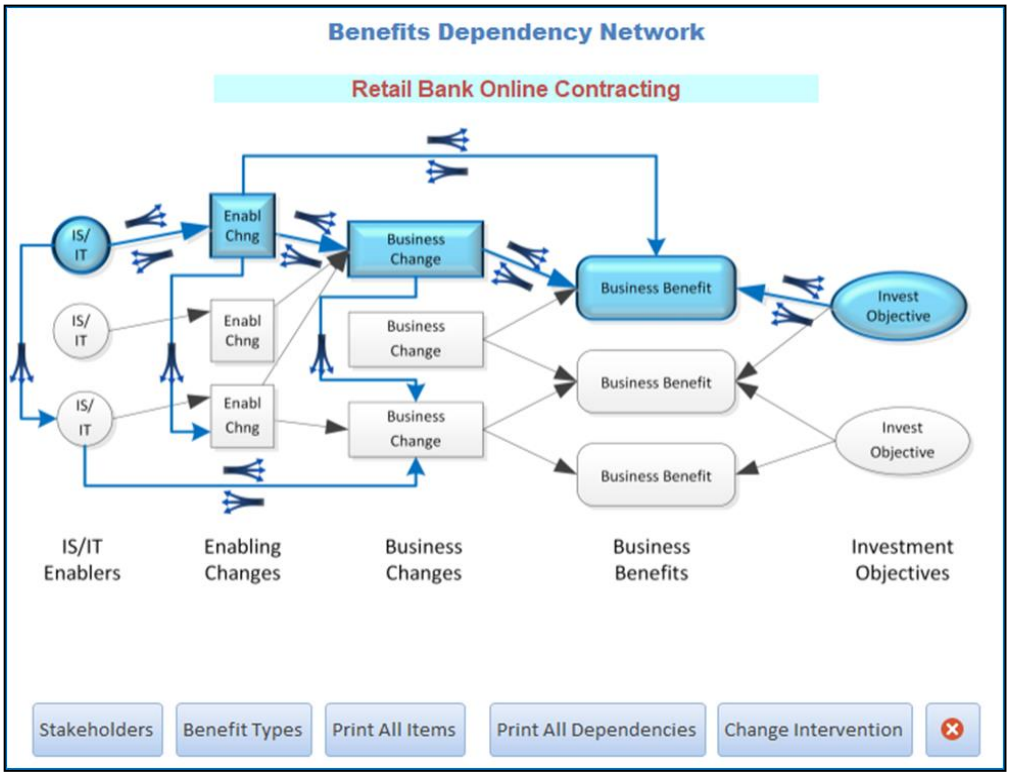

Figure 2: Main menu of the Benefits Management System (BMS)

Benefits Dependency Network

The software tool allows visualizing, creating and editing of dependencies from the various elements of the network, as defined by the Benefits Management approach. The dependencies can be viewed or edited from either origin to destination or the other way around. For example, it is possible to view or edit the dependencies from Business Changes to Business Benefits (i.e., which benefits depend on a given change) or from Business Benefits to Business Changes (i.e., which business changes must be implemented to achieve a given benefit).

It is also possible, as defined by the Benefits Management approach, to have dependencies among elements of the same type, for example, from one business change to several others. The network presented in Figure 2 shows the dependencies found in the case study of this research project.

Applying the BMS Software in a Case Study Environment

Case study research is generally recognized as a good method to evaluate an artifact in the validation phase of a design science project (Hevner et al., 2004). The case study described in this paper analyses the usage of the BMS software to manage business benefits from the implementation of a software system for online contracting in a Portuguese retail bank.

In a context of decreasing operating margins, banks are looking at new ways to enlarge their customer bases and increase the average return per customer. According to the International Monetary Fund in its Global Financial Stability Report, published in October 2016, "*although most advanced economy's bank balance sheets are robust, sustainable profitability is weak, reflecting unresolved legacy problems and bank business model challenges*" (IMF, 2016, p. 1). The bank where the case study was conducted had decided to close a significant number of local branches, thus having an enormous reduction in the points of contact with the customers and prospects. On the other hand, they need to catch up with its competitors in the self-service areas, in which they are falling behind.

Management has three main drivers that lead to the intervention targeted by the presented case study:

- The need to increase profits;
- Branch reduction without reducing customer interaction;
- Catch-up with competitors on process dematerialization and digital transformation.

In this context, the bank decided to implement a new information system to support the acquisition of specific financial products. This system, called "*Bank Online Contracting*", was proposed by the Marketing Department, to enable customers to acquire specific financial products directly through electronic channels. Although the basic requirements of the system were already defined, the technical specifications were still under analysis.

Data used in the case study were gathered in several meetings with the CIO (Chief Information Officer) and other senior managers from the departments of marketing, information systems, and organizational & quality control. The method adopted was based on Mike Cohn (2004), that discusses how to write requirements and user-stories using Agile methods.

The use of BMS proved to be very helpful in producing the Benefits Dependency Network, as the data elements were immediately organized, structured and documented. Without the software tool, all the data gathered would have to be later organized and checked for missing information. The components of the Benefits Dependency Network, and their dependencies, were described and analysed.

Investment Objectives

There are four main objectives of the bank. They are the following:

- ***O01 – Increase Sales*** **-** sales can be increased by adding a new sales channel;
- ***O02 – Maintain or increase client proximity*** - although the number of branches is decreasing, the bank wants to maintain or increase the interactions with customers;
- ***O03 – Improve customer experience*** - reduce bureaucracy and process complexity;
- ***O04 – Reduce costs*** **-** Reduce operational costs.

Business Benefits

A benefit is, by definition, an advantage for any stakeholder (Ward & Daniel, 2012) and there is a set of business benefits identified for this project:

- ***B01 – Increase financial return of Personal Loans*** **-** Increase the amount charged on commissions over personal credit products and financial margin. This is a financial benefits. The current value is 477.000 € and the expected value of this benefit, one year after the operation begins, is 525.000 €.
- ***B02 – Increase net interest income for NOL products*** **-** Increase in the net margin in commissions and interest charged for Negotiated Overdraft Limit (NOL) products, i.e., negative value in account balance, contracted by the customers. The current value is 65.500 € and the expected value of this benefit, one year after starting the operation, is 72.000€.
- ***B03 – Increase sales commission on non-financial insurance*** **-** This is a financial benefit, measured in euros. The current value is 118.000€ and the future value of this benefit is 130.000€. The bank has a market-share of 13% for this product, which is not aligned with the bank's market position. The objective is to increase 10% the number of contracts. The estimated value is 1.6 million euros. After the first year of operation, the bank expects to have a return of 130.000€ for this product.
- ***B04 – Increase sales commission for new financial assets accounts*** **-** This is a financial benefit, measured in euros. The current value is 61.800 € and the expected value, one year after, is 77.000 €. The proportion of private customers holding an active investment account is 7%, while the country average is 18%. This bank's digital penetration at the level of Investment Accounts (Digital Investment Customers / Total Investment Customers) is 44%, while the country average is 70%. After analyzing the process it was concluded that about 77,000€ in commissions are expected by the end of the first year.

- ***B05 – Reduction of costs for paper archives*** **-** Paper documents currently collected at the counters will no longer exist in the new on-line processes, thus reducing the cost of paper storage. The current archive of physical paper processes has a calculated cost attached. Thus, although it is a financial benefit measured in euros, it is currently not possible to estimate how much performance will improve when changes are completed.
- ***B06 – Reduction of resources associated with the business process*** **-** By allocating less human and material resources to business process associated with the contracting of the products (fixed costs of direct contact with the customers), these resources can be reused in other processes. This is a financial benefit but it is currently not possible to estimate the extension of performance improvement once changes are accomplished.
- ***B07 – Reduction of the customer churn rate caused by closing branches*** **-** The current downward trend in the number of bank branches is likely to increase customer churn rate. The project should help to reduce that effect by maintaining a digital proximity with customers. This contribution could be measured at the end of one year of project use. It is a measurable benefit as, although the current customer churn rate is known, there is no knowledge about the impact that closing bank branches will have on that rate. Hence, it is not possible to anticipate the contribution the investment under study will have in attenuating that effect. The unit of measure is the customer churn rate, measured in the ratio of number of customers that left in one year over the number of total active customers.

Business Changes

To attain the business benefits declared above with the intervention under study, some changes must be made to the business processes, i.e., the way business is conducted. The work group declared the following changes to be applied to the business processes to reach the desired business benefits:

- ***C01 – Acquisition of Personal Credit products will be available online*** - *Customers will be able to conclude a purchase of a Personal Credit by simply accessing the digital channel, either using the web or through a mobile application.*
- ***C02 – Acquisition of Non-Financial Insurance products will be available online*** **-** *Customers will be able to conclude a purchase of a Non-Financial Insurance by accessing the digital channel, using either a web application or a mobile application.*
- ***C03 – Acquisition of NOL products will be available online*** - *Customers will be able to conclude a purchase of a Negotiated Overdraft Limit (NOL) product by simply accessing the digital channel, in either a web or a mobile application.*

- ***C04 – Opening of a new Financial Assets Account of will be available online*** - *Customers will be able to open a new Financial Assets Account by simply accessing the digital channel, either using the web or through a mobile application.*
- ***C05 – Stop collecting physical paper copies of procedural documentation*** - *Nowadays, for each process of credit, paper documents are collected, sent to the customer's physical files and, then, sent to the central archive. This represents significant data processing and warehouse costs. Online acquisition no longer needs physical documents, which brings a considerable process simplification and significant savings.*

Enabling Changes

Enabling changes are important to allow business changes to be properly implemented.

- ***E01 – Change contract drafts to accommodate online acquisition*** - *The drafts of service contracts must be improved, to include online acquisition clauses.*
- ***E02 – Change internal operating rules to include online acquisition*** - *Business process rules will have to be changed, in order to include online acquisitions.*
- ***E03 – Prepare communication materials for online acquisition*** - *Designing a communication plan for launching new online acquisition features.*

IS/IT Enablers

Nowadays, more and more organizations put in place change management programmes, business development and strategic initiatives, that need to be supported by IS/IT.

- ***I01 – Change workflow platform to gather client file*** - *The workflow platform of the bank needs to be improved, to allow the workflow system loading customer data.*
- ***I02 – Create new input channel on the workflow platform*** - *The workflow platform needs to be able to accept a new input channel, more precisely, to read inputs on the online software platform.*
- ***I03 – Change front end of Online Banking platform*** - *The front-end of the online system needs to be changed to include sales of new products and services.*

In workshops that took place in the Bank's headquarters, all the elements necessary to apply the Benefits Management method were defined and documented. The team had all the necessary information to create the graphical representation of the Benefits Dependency Network, presented in Figure 3. The Benefits Dependency Network provides a global overview the components of the network and dependencies between them, but it does not provide a deeper view into each of the elements of the network.

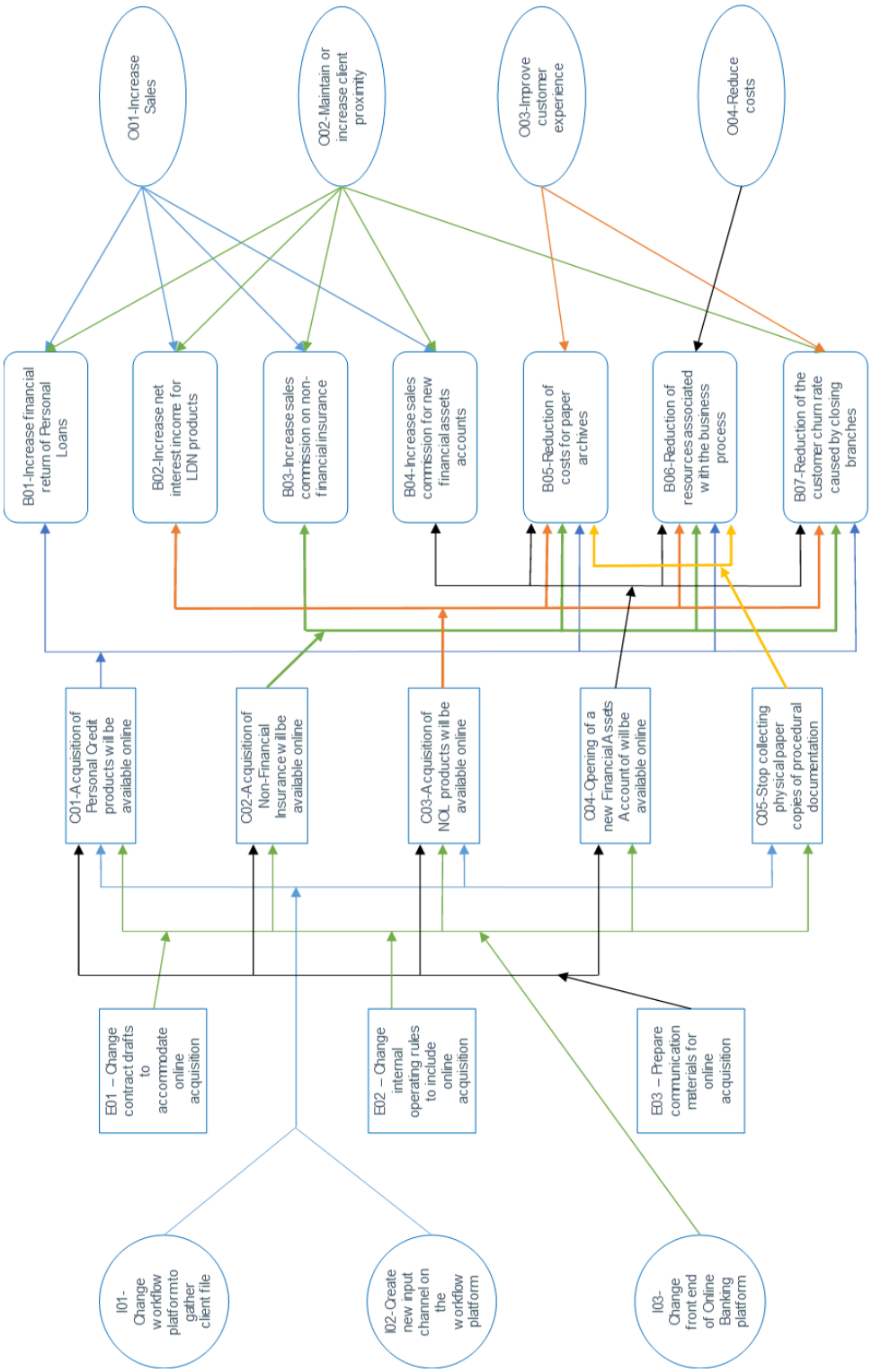

Figure 3: Benefits Dependency Network for the Case Study

Case Study Analysis

In a Case Study analysis meeting, that took place in the bank, the participants, top managers from the departments of information systems, marketing and operations, were informed that the agenda was obtaining their perspective on the following subjects:

1. Contribution, usability, and opportunities for improvement of the Benefits Management method;
2. Relevance of using a software tool to store and manage the components of the network and their interdependencies;
3. Design of screens, data structure, reports and diagrams of the software;
4. Other comments and suggestions.

The participants provided their opinion on all the above items, based on their experience. According to a senior IT manager, the highest value added from this method is trying to quantify everything that has a real impact on the project and the work that has to be done, in the organization, to reach its objectives, which is not usually recognized in organizations. She mentioned that when organizations look at a project to analyze its cost, managers are more concerned about the cost of the externally contracted resources and systems than the in-house cost of staff that makes business changes. Another manager pointed out that a significant benefit of the method was encouraging people, from different areas of the organization, to get together, clarify objectives, benefits and business changes.

According to one of the participants, the method is useful and interesting, although, at the beginning, its concepts are not very easy to understand. Once people get used to it, then it is useful and people can actually see the changes that must be made, within the organization, to attain the objectives and reach the expected benefits of the investments.

The participants agreed on the following items:

- The Benefits Management methodology is useful during the pre-project phase, to build the business case for the project;
- It is useful to review and complete the whole Benefits Dependency Network during the definition of requirements in user-stories;
- The Agile Methodologies state that after a maximum of 6 releases or three months there should be a new release, a version of the system that actually goes into production (Martin and Martin, 2006). At the end of each release cycle, there should be a review of the Benefits Dependency Network and all of its elements. This is the moment for looking at the work that has been done and the benefits that have been achieved or not achieved.

Participants believed that it would be much easier to implement the Benefits Management approach with the help of the BMS software. The software tool would increase the usage of the method.

The software application also helps storing and accessing historical data. It would contain very rich data, which would help to improve the accuracy of new predictions on business performance, or cost reduction. If the application was used in other organizations, it would even be possible to do benchmarking with other cases.

It was stated that if the organization decides to adopt the Benefits Management method, the BMS system could be very useful. A participant argued that the most important thing about the eventual use of a software application is standardizing data. In this case study, the software tool helped to structure and standardize the data gathered for the Benefits Dependency Network. Without this, each user would create data in his or her own way, without following standards. Any software application to be used should show results either as a graphical interface or as a report.

Discussion

This research project was supported by the Design Science Research Methodology, as proposed by several authors (Hevner and Chatterjee, 2010; Dresch, Lacerda and Júnior, 2015). The methodology includes the definition and creation of artefacts, their evaluation, presentation and analysis of the results.

The literature review on the implementation of IS/IT projects in organizations, has shown that the level of success, in most projects, has opportunities for improvement. Over the years, the success rate of IS/IT projects has been consistently at about one third of the total number of projects implemented (Sauer, Southon and Dampney, 1997; Standish Group, 2011; Hastie and Wojewoda, 2015; Serrador and Pinto, 2015; Vachon, 2016). Most companies, even when increasing their spending in IS/IT, fail to see the corresponding increase in business profitability, thus not getting real business benefits from the investment (Tippins and Sohi, 2003; Hesselmann, Ahlemann and Böhl, 2015).

Even when organizations report that IS/IT projects were successful, most of the times they are only looking at success in terms of delivery time, money spent and meeting business requirements. Since a project can be unsuccessful although meeting those criteria (Farbey, Land and Targett, 1999; Serrano and Caldeira, 2002; Caldeira and Ward, 2003; Peppard, Ward and Daniel, 2007), there are cases of complete failures, in spite of having delivered on-time, within the budget and with quality (Collyer *et al.*, 2010; Serrador and Pinto, 2015).

This case study helps to show that there is a gap between knowing how to do and doing it, and this is what brings relevance to this research project, which aims to, by the use of Design Science, build artefacts to help improving the use of the Cranfield Benefits Management method.

Given the low usage of any benefits management method in organizations, worldwide, the argument presented in this research is that a software tool could improve significantly the adoption of a benefits management approach in organizations, by adding flexibility and helping to manage complexity.

BMS enables time and cost reduction, and provides a better understanding of business benefits. The benefits management project can be properly documented and data available for auditing. In large information technology projects the benefits of using the BMS software may be significant.

The BMS system, although still a working prototype that needs to be improved, is a fully functional application, with a good usability, although needing a better graphical user-interface and reporting facilities. The next working version of the software will also enable multi-user. Several professionals will be able to input data into the BMS at the same time, increasing the efficiency of the benefits management processes.

It was reported by the users and project participants that the use of the BMS strongly contributed to improve benefits management practices in the project. The main advantages of the BMS tool recognized by the project participants were the possibility of having a functional decomposition of the network elements, which can be useful in big projects, the use in a multi-project environment, and the flexibility to change values and dependencies during project planning and execution in a collaborative environment.

Although the version used is essentially a working prototype, it was reported that BMS is a good piece of software, important in the adoption and use of a Benefits Management approach.

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